Present Status of Dermabrasion

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• **The use of dermabrasion for cosmetic purposes is becoming less popular due to limitations inherent in the method despite the fact that it is still the best method available for the minimizing of acne scarring. Planing for precancerous skin is increasing in demand because of definite benefits to be gained from its use. While the method has not attained universal acceptance for the latter purpose, 80 per cent of dermatologists who have tried this approach, and who answered a questionnaire, rate the benefits obtained as excellent or good. Only 3.5 per cent considered the results as poor. In a five-year period between two questionnaires, there was in general a trend away from enthusiasm for this modality, but esteem for it as a way of dealing with precancerous skin held up better than opinion of its use for cosmetic purposes.**

WHILE PROBABLY Kromayer was the first to use cutaneous planing, in 1905,[4] it was not until the plastic surgeons had popularized the employment of sandpaper for the treatment of scars that Kurtin published his paper on dermabrasion in 1952.[5] Since then, many dermatologists have adopted this procedure. The reasons for this acceptance have varied but certainly many dermatologists were convinced of the value of this modality—and still are. Now, ten years after Kurtin's article, a sufficient number of dermatologists have used the treatment enough and followed enough patients for a sufficiently long time to permit accurate gauging of the values and weaknesses of dermabrasion.

COSMETIC PURPOSES

At the outset, it should be emphasized that the benefits vary with the skill of the operator and his judgment in the selection of cases. However, each practitioner assays his results through different eyes. It has been pointed out repeatedly that as a rule the subjects of this approach are happier with the results obtained than is the operator. In a like manner, one physician is more critical of the remaining scars, the hyperpigmentation and the other unfortunate results of this treatment than is another. This is not to imply that those who are enthusiastic about the procedure are too blind to see the inherent weakness. It is quite possible that they are better dermatosurgeons than are their colleagues.

Still, one must recognize and admit the weaknesses inherent in the method—regardless of the skill of the operator. For instance, it is impossible to obtain a perfect result in more than the occasional patient. This is because much of the pitting is produced by cicatricial tissue deep in the corium, pulling the epidermis down. If one were to plane deeply enough to eradicate this scar tissue, the planing would produce scarring of its own. Therefore, even repeated planing will not bring about a perfect result. Since the scarring cannot be removed completely, the improvement is relative only. We speak glibly to "50 to 85 per cent improvement." But, just what do we mean? There is no yardstick to establish these values. Furthermore, most people are capable of recognizing only the complete eradication of a cosmetic defect—not its minimization. Our insistence on *before* photographs is a tacit admission on our part that the skeptical patient may not be able to recognize the clinical "percentage-wise" improvement in his appearance. While the patient may be pleased with the results, persons around him may find it difficult to see what has been accomplished. Since these relatives, friends and acquaintances are the reservoir of future patients, disappointment in the results obtained must lead to a decreased demand for this operation.

Also, the complications are not trivial. The most important ones can be lumped under the heading of "impaired appearance." After the crusts fall off, the planed skin is pinker than the surrounding tissue. No amount of "feathering" of the edges can make traumatized tissues match the surrounding skin. It is true that, in most instances, eventually the abraded area assumes the same hue as the untraumatized portions, but this may take months or even years. It is all well and good to tell the patient that the hyperpigmentation, or occasionally depigmentation, is due to his ignoring of the surgeon's advice to avoid sunlight. However, to be perfectly honest, a question that we must ask is, how is the patient in California to completely avoid sunshine? Solar radiation hits his face when he looks out of a window, drives in a car, or walks in the fog or

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smog. The wearing of sunscreens and hats has not eliminated this problem completely.

For these reasons, and many others, planing for cosmetic purposes must be of limited value and limited applicability despite the fact that it is the best treatment for the removal of the scars—except, perhaps, tincture of time.

PRECANCEROUS SKIN

Epitheliomas may result from several different factors. However, it is well recognized that the most common cause is solar radiation, especially in blondes and redheads with fair skin and blue eyes. It is obvious, also, that such radiation does not penetrate deeply. Therefore, it seems likely that the carcinogenic effect is exerted on the superficial portions of the skin. The frequency of epitheliomas, in contra-distinction to sarcomas, lends credence to this concept. It is reasonable to assume that if the epidermis were removed, new epidermal tissue would arise from the cutaneous adnexa. In fact, Ayres and others[1] have demonstrated the validity of this supposition by careful histopathologic studies. Even in chronic radiodermatitis, the outer layers of the skin are affected more severely than the deeper ones.

Planing will remove keratoses simply and rapidly—as simply and rapidly as any method at our disposal. On the other hand, while it may be as effective as other approaches, it offers no significant advantage except that of speed in the treating of multiple lesions. Rather, its value resides in its employment to *prevent* the further development of keratoses and epitheliomas. It is well established that a patient who has one senile keratotic lesion or an epithelioma is apt to have more of them later, for the appearance of the first such neoplasm indicates that the exposed areas of the skin have been damaged sufficiently by the passage of time and the relentless beating of the sun to undergo malignant degeneration. Eradication of the new growths by surgical, chemical or radiologic methods cures the lesion; it does not prevent the growth of other tumors in other portions of the exposed skin.

On the other hand, removing the entire injured area, and replacing it with undamaged skin such as would exist in deeper adnexa would give the patient a new start. But since the new cutaneous surface would contain epithelium of the same age and heredity faults that were inherent in the tissue that was destroyed, if the patient were to expose the new skin to excessive sunshine, he could expect new keratoses and epitheliomas. Furthermore, because of the age of the tissue, it would not take as much sunshine to cause recurrences as it did originally. However, if judgment were used in solar exposure, recurrences would not be anticipated. Therefore, a potential dermatologic cripple would be given a second chance to lead a normal life without the constant threat of malignant disease and the need for repeated destructive or surgical therapy.

In 1954, an attempt was made to study this possibility in three representative patients, one with chronic radiodermatitis of the hand, one with multiple recurrent actinic keratoses and epitheliomas and one with recurring cigarette-induced keratoses and epitheliomas of the lip.[2] Two of these patients are still under observation eight years later, and the other was followed for more than two years. All obtained decided benefit. The patient with the x-radiation damage has had several keratoses but much fewer than before operation. The one with the actinic-damaged skin had no tumors in the planed areas during the more than two years that he was observed, but many such keratoses developed in the areas that were not planed. In the case of the patient with lesions of the lip, leukoplakia developed three years after planing but this responded rapidly and apparently permanently to x-ray therapy. Therefore, one could say that the procedure was successful in these patients.

Perhaps the word *successful* requires a little consideration in itself. If one expects 100 per cent preventive results in every case, then *successful* is not a proper term. But then, this would mean that there were no "successful" procedures in medicine. All the patients that I have treated in this manner have obtained benefit—an absence or decrease in neoplastic changes in the planed skin despite the fact that one would have expected an acceleration in the degenerative processes with advancing age. Furthermore, the unplaned skin acts as a control since the changes continue in these areas while the abraded surfaces remain comparatively free of these complications. While keratoses have developed in planed skin, I have never seen an epithelioma in skin so treated.

In 1957, a questionnaire was mailed to 120 dermatologists who were known to perform the operation of planing, asking about their results with the modality in cancerous or precancerous skin.[3] A hundred and three of them (86 per cent) replied. Their comments on the use of dermabrasion in senile or actinic skin were of interest. Thirty-three of the respondents had some experience in treating such cutaneous surfaces with a motor-driven whirling brush. In some instances it was difficult to determine from the replies whether the operation was done merely to eradicate preexisting keratoses or also encompassed uninvolved skin as prophylaxis against the future formation of other keratoses or epitheliomas. There was no question, however, that prophylaxis was a factor in a large number of cases

and that many patients had been observed for two or three years afterward with inordinately low incidence of new tumors. Three of the respondents classified their results as fair or poor. The other 30 were at least satisfied with the results obtained and 14 of them could be classified as enthusiastic. More than 1300 cases were reported in this survey.

Even then, five years ago, there was little question among dermatologists with experience with these cases, that the treatment of the senile skin is one of the prime indications for dermabrasion. Many of them (this author included) felt that this application would become the most important use of this therapeutic modality. While new tumors can appear in the planed area, as was pointed out before, this questionnaire established that the recurrences (if this term can be applied to these new lesions) were much less frequent than those appearing in the adjacent unplaned areas or in the same patient before the planing operation. I felt that perhaps the rate of recurrence was inversely proportional to the depth of the planing.

To see what had happened to the opinions of the respondents in the five years since the survey reported in preceding paragraphs, these dermatologists were asked again for their current opinion on the value of dermabrasion in the senile skin. Of the three who were disappointed in its use in 1957, one did not answer, one said that he had not used it further and one was employing the procedure with some benefit. The other thirty seemed to feel as they had five years earlier.

RESULTS OF SURVEY

The foregoing statements represent only the convictions of the author plus a recitation of experience by a few contributors to a questionnaire. In order to determine the present status of dermabrasion among dermatologists in America, a second questionnaire was sent to 1631 fellows of the American Academy of Dermatology in the Fall of 1961. At the time of this writing, 1075 replies had been returned and the flow of replies diminished to a trickle, indicating that the number that would be received in the future would be too small to affect the statistical compilations. Since this is only a 65.2 per cent response, the question of statistical validity must be raised, for there is no way of knowing whether the 556 who were not heard from performed the procedure of planing or shunned it. The decrease in replies from the 86 per cent received in 1957 may represent decreased interest in this procedure by the dermatologists of this country.

Of these replying 517 (48 per cent) said they had never adopted this modality; 558 (52 per cent) had some experience with it. Of the latter group, 107 (19.1 per cent) had tried it, found it wanting and dropped it. Among those who still did planing, there was a tendency to do it less than five years ago:

	Proportion Using Procedure		
For:	*More (Per Cent)*	*Same (Per Cent)*	*Less (Per Cent)*
Cosmetic reasons	11.3	31.4	57.3
Precancerous skin ..	27.3	41.0	31.7
Other conditions	16.3	46.1	38.0

It should be noted that the decrease was much less pronounced for "precancerous skin" than for "cosmetic" and "other reasons." Two-thirds of those who had discontinued planing said they had done so because of dissatisfaction with results. Other commonly voiced explanations included lessening demand due to disappointment with results, decreased publicity in the lay press, and lack of time on the part of the practitioner. Interestingly, six per cent stopped using the procedure because of the actual occurrence of medicolegal complications or fear of them.

Among those who had never performed the operation of dermabrasion, dissatisfaction with results of others led the reasons for not doing it. This was followed in diminishing order by lack of demand on the part of the patients, lack of time, the necessity for training, the fear of entanglement in malpractice actions, the presence of more competent associates and the fear of medical complications. The more common reasons given for having never adopted this modality or for discontinuing use of it are listed in Table 1.

Opinions as to results obtained or observed were compiled for three groups—those who had never used planing, those who were still performing this operation and those who had discontinued it. The evaluations obviously are a matter of opinion and can only be looked upon as reflecting trends.

The opinions are shown in Table 2.

It is obvious that today the use of planing is considered to be more successful for precancerous skin than for acne scarring or for other cosmetic purposes. This difference is displayed even more dramatically when the opinion of those who have used the method themselves for the treatment of the actinically damaged or senile skin is tabulated. Thirty-two (20.1 per cent) of these surgeons considered the results to be excellent. Eighty-four (57.9 per cent) rated it as good, 24 (16.5 per cent) felt that the results are only fair, while 5 (3.5 per cent) classified them as poor. While some of the critics were bitter about employment of this modality, classifying it as "absurd" or a "hoax," it is obvious that this use is standing the test of time.

TABLE 1.—Reasons Given by Dermatologists for Never Having Used or for Discontinuing Dermabrasion

Reason	Never Planed		Stopped Planing		Total	
	No.	Per Cent	No.	Per Cent	No.	Per Cent
Dissatisfaction with results	135	27.0	66	64.5	201	19.2
Lack of demand on part of patients	70	14.0	13	12.5	83	8.1
Lack of time, too time consuming	63	10.6	12	12.1	75	7.2
Necessity for training	51	10.2	0		51	4.9
Associates available	33	6.6	3	3.0	38	3.5
Too old, limited practice, hate surgery, etc.	29	6.0	6	6.1	35	3.4
Medicolegal entanglement	27	5.6	6	6.1	33	3.2
Medical complications	24	5.0	4	4.0	28	2.7
Lack of facilities	14	2.9	0		14	1.4
Prefer to refer to others	14	2.9	0		14	1.4
Good results with other methods	10	2.7	2	2.0	12	1.2
Believe it to be plastic surgery	9	1.9	0		9	0.9
Cost to patient	8	1.7	0		8	0.8
No need in small town	7	1.4	0		7	0.7

TABLE 2.—Dermatologists' Opinions as to Results Obtained with Dermabrasion

	Cosmetic Purposes		Precancerous Skin	
	No.	Per Cent	No.	Per Cent
Those who never had planed:				
Excellent	8	2.8	6	10.2
Good	53	18.2	33	56.0
Fair	196	67.0	13	22.0
Poor	34	11.8	7	11.9
Those who were still planing:				
Excellent	20	6.1	34	20.0
Good	170	43.5	96	56.1
Fair	174	44.5	29	17.0
Poor	26	6.7	12	7.0
Those who had discontinued the procedure:				
Excellent	0	0.0	2	8.7
Good	15	21.5	19	82.6
Fair	31	44.4	2	8.7
Poor	24	34.0	0	0.0
All three categories combined:				
Excellent	28	3.7	42	17.6
Good	238	31.3	139	58.0
Fair	398	53.2	44	17.6
Poor	84	11.1	19	7.7

The correspondents were asked also in what other conditions they used planing. A number of conditions were listed. The ones most commonly reported on favorably were: tattoos, hyperpigmentation, seborrheic keratoses, nevi, traumatic scars, adenoma sebaceum, vascular nevi, rhinophyma, keloid, hyperkeratotic conditions, and trichoepithelioma multiplex. However, it must be stressed that there were almost as many skeptics as advocates for each of these applications.

In addition to making it clear that use of dermabrasion is fairly well confined to the improvement of scars (mainly acne) and the prevention of malignant degeneration, this list of "other uses" includes one surprise—tattoos. Most dermatologists feel that planing is of little value for tattoos. As a rule, the tattoo is too deep for removal by this method. The patient ends up with a mottled lesion that is part normal skin, part scar and part tattoo. Moreover hypertrophic scarring has occurred not infrequently following this approach in such lesions. However, many of the correspondents felt that dermabrasion is beneficial in this condition, especially for "fresh tattoos" or accidental ones following trauma. Of course, the success is dependent more on the depth of the implantation than on any other single feature.

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